

C. Amendment to the Claims

Please cancel claims 6-8, 10, 15-18, 49, 51, 52 and 55-60 without prejudice or disclaimer.

Please amend claims 1, 2, 4, 5, 9, 11-14, 19-23, 48, 50 and 61 and add new claims 62 and 63 as follows.

---

1. (Currently Amended) A structure mesostructured material comprising:  
a first portion containing a polymer; and  
a second portion formed on the first portion,  
wherein the second portion has tubular pores, and the tubular pores are  
aligned uniaxially mesopores, which are oriented in a first direction and which are arranged  
on a polymeric surface made of a polymer compound whose chains or molecules are  
oriented in a second direction.
  
2. (Currently Amended) The structure mesostructured material according to claim 1, wherein the second portion contains containing silicon.
  
3. (Cancelled)
  
4. (Currently Amended) The structure mesostructured material according to claim 1, wherein the polymer is aligned in a direction, which is different from  
an alignment direction of the tubular pores first direction and the second direction are  
different from each other.

5. (Currently Amended) The structure mesostructured material according to claim 4, wherein the polymer alignment direction and the tubular pores alignment direction first direction and the second direction are substantially orthogonal each other.

6-8. (Cancelled)

9. (Currently Amended) The structure mesostructured material according to claim 1, wherein the first portion contains polymeric surface contains at least one polymer selected from the group consisting of polyethylene, nylon, polybutylene terephthalate, polyethylene terephthalate, polyester, polyimide and parylene polyparaxylilene.

D  
10. (Cancelled)

Cont.  
11. (Currently Amended) The structure mesostructured material according to claim 1, further comprising wherein the polymeric surface is constituted of a polymeric film arranged on a substrate on which the first portion is formed, and the mesostructured material is formed on a free surface of the polymeric film.

12. (Currently Amended) The structure mesostructured material according to claim 11, wherein the substrate material is made of a glass.

13. (Currently Amended) The structure according to claim 1, wherein a mesostructured material comprising:

\_\_\_\_\_ a polymer material surface in which chains of the polymer material are oriented in a first direction parallel to the polymer material surface; and  
\_\_\_\_\_ a material provided on the polymer material surface, the material having tubular mesopores, wherein the tubular mesopores are oriented in a second direction nearly perpendicular to the first direction, and the oriented tubular mesopores are formed on the polymer material surface with silica located outside of an oriented surfactant is held in the tubular pores micelle structure of which orientation is determined by parallel accommodation of molecules of the surfactant on the chains of the polymer material through chemical interaction.

14. (Currently Amended) The structure mesostructured material according to claim 13, wherein the surfactant is a cationic surfactant or a nonionic surfactant.

D  
Cont.  
15-18. (Cancelled)

19. (Currently Amended) The structure mesostructured material according to claim 13, wherein the first portion polymer material surface is comprised of a Langmuir-Blodgett film.

20. (Currently Amended) The structure mesostructured material according to claim 13, wherein the first portion comprises polymer material is at least one polymer selected from the group consisting of polyethylene, nylon, polybutylene terephthalate, polyethylene terephthalate, polyester, polyimide and parylene polyparaxylilene.

21. (Currently Amended) The structure mesostructured material according to claim 20, wherein the polymer material is polyimide.

22. (Currently Amended) The structure mesostructured material according to claim 13, wherein the pores mesopores are hollow.

23. (Currently Amended) The structure mesostructured material according to claim 13, wherein the first portion polymer material surface is constituted of a film of a the polymer material, the film being arranged on a substrate, and the substrate is made of silicon oxide.

24. (Withdrawn) A process for forming a mesostructured material having tubular mesopores comprising steps of:

- D  
D  
Cont
- (i) providing a polymeric surface subjected to an alignment control treatment; and
  - (ii) bringing the polymeric surface into contact with a solution containing a surfactant and an alkoxide, hydrolyzing the alkoxide and forming the mesostructured material on the surface.

25. (Withdrawn) The process according to claim 24, wherein the step (i) comprises the sub-step of rubbing a polymeric surface as the alignment control treatment.

26. (Withdrawn) The process according to claim 24, wherein the step (i) comprises a sub-step of providing a polymeric surface constituted of a Langmuir-Blodgett film.

27. (Withdrawn) The process according to any one of claims 24 to 26, wherein the step (ii) includes a step of immersing the polymeric surface into the solution.

28. (Withdrawn) The process according to any one of claims 24 to 26, wherein the polymeric surface contains at least one polymer selected from the group consisting of polyethylene, nylon, polybutylene terephthalate, polyethylene terephthalate, polyester, polyimide and parylene polyparaxylilene.

29. (Withdrawn) The process according to claim 28, wherein the polymeric surface contains polyimide.

30. (Withdrawn) The process according to claim 24, further comprising a step of removing the surfactant within the mesopores and hollowing the mesopores.

31. (Withdrawn) The process according to claim 30, wherein the step of removing the surfactant within the mesopores includes calcining the mesostructured material resulting from the step (ii).

32. (Withdrawn) The process according to claim 30, wherein the step of removing the surfactant within the mesopores includes extracting the surfactant within the mesopores with a solvent from the mesostructured material resulting from the step (ii).

33. (Withdrawn) The process according to claim 30, wherein the step of removing the surfactant within the mesopores includes extracting the surfactant within the mesopores with a critical fluid from the mesostructured material resulting from the step (ii).

34. (Withdrawn) A process for forming a mesostructured silica having tubular mesopores comprising the steps of:

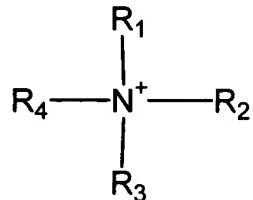
- (i) providing a polymer material surface in which chains of the polymer material are oriented to a first direction parallel to the polymer material surface; and
- (ii) forming a mesostructured silica having tubular mesopores on the polymeric surface, the mesopores being filled with a surfactant and oriented towards a second direction nearly perpendicular to the first direction, by forming an oriented rod-like surfactant micelle structure outside of which silica locates on the polymer material surface, the orientation of the rod-like surfactant micelle structure being determined by parallel accommodation of molecules of the surfactant on the chains of the polymer material through chemical interaction.

D  
Cont

35. (Withdrawn) The process according to claim 34, wherein the surfactant is a cationic surfactant or nonionic surfactant.

36. (Withdrawn) The process according to claim 35, wherein the cationic surfactant is a quaternary alkylammonium salt.

37. (Withdrawn) The process according to claim 36, wherein the quaternary alkylammonium is represented by the following structural formula:



wherein R<sub>1</sub> to R<sub>3</sub> are independently a methyl group or ethyl group and R<sub>4</sub> is a C10 to C18 straight chained alkyl group.

38. (Withdrawn) The process according to claim 37, wherein R<sub>4</sub> is a C12 to C16 straight alkyl group.

D  
Cont.  
39. (Withdrawn) The process according to claim 35, wherein the nonionic surfactant is an alkylamine or a surfactant containing or polyethylene oxide as a hydrophilic group.

40. (Withdrawn) The process according to claim 34, wherein the step (i) is a step of providing a Langmuir-Blodgett film of a polymer compound on a prescribed substrate.

41. (Withdrawn) The process according to any one of claims 34 to 40, wherein the polymer material is at least a polymer selected from the group consisting of polyethylene, nylon, polybutylene terephthalate, polyethylene terephthalate, polyester, polyimide and parylene polyparaxylilene.

42. (Withdrawn) The process according to claim 41, wherein the polymer material is polyimide.

43. (Withdrawn) The process according to claim 34, wherein the step (ii) is a step of hydrolyzing an alkoxy silane while the surface of the polymeric compound is in contact with a solution containing a surfactant and the alkoxy silane.

44. (Withdrawn) The process according to claim 34 further comprising a step of removing the surfactant in the mesopores.

45. (Withdrawn) The process according to claim 44, wherein the surfactant is removed by calcining the mesostructured silica obtained in the step (ii).

D,  
46. (Withdrawn) The process according to claim 44, wherein the surfactant is removed from mesostructured material obtained in the step (ii) by extracting with a solvent.

47. (Withdrawn) The process according to claim 44, wherein the surfactant is removed from the mesostructured material obtained in the step (ii) by critical fluid extraction.

48. (Currently Amended) The structure according to claim 11, wherein the tubular pores A mesostructured material comprising:  
\_\_\_\_\_  
\_\_\_\_\_ a polymeric surface; and  
\_\_\_\_\_ a material provided on the polymeric surface, the material having tubular mesopores,

~~wherein the tubular mesopores are oriented in a direction parallel to the substrate the surface, and the direction is determined by a direction of a rubbing treatment of the polymeric surface.~~

49. (Cancelled)

50. (Currently Amended) The structure according to claim 48, wherein axes of the tubular pores A mesostructured material comprising:

~~a polymeric surface comprising a polymeric compound; and~~

~~a material provided on the polymeric surface, the material having tubular mesopores;~~

~~wherein the tubular mesopores are oriented in a direction parallel to a surface of the substrate surface, and the direction is determined by an orientation direction of the polymeric compound's polymer chain.~~

D  
Cont.  
51-52. (Cancelled)

53. (Withdrawn) A process for controlling an orientation of tubular mesopores of a mesostructured material comprising the step of hydrolyzing an alkoxide while a polymeric surface which has been rubbed, is in contact with a solution containing a surfactant and the alkoxide.

54. (Withdrawn) A process for controlling an orientation of tubular mesopores of a mesostructured material comprising a step of hydrolyzing an alkoxide while a polymeric surface constituted of a polymeric compound whose polymer chains

have been oriented towards a prescribed direction parallel to the polymeric surface, is in contact with a solution containing a surfactant and the alkoxide.

55-60. (Cancelled)

D  
CONT

61. (Currently Amended) The structure according to claim 1, wherein the second portion has one end at one side and another end at another side and the tubular pores extend through from said one end to said another end A mesostructured material having mesopores formed on a polymeric surface made of a polymeric compound, wherein the mesopores are oriented linearly from an end to another end of the mesostructure.

62. (New) The structure according to claim 1, wherein the tubular pores are mesopores.

D2  
63. (New) A structure comprising:

a substrate;  
a portioned formed on the substrate,  
wherein the portion has tubular pores, and the tubular pores are aligned uniaxially.